

2
G. W. B.

Compliments of the Writer

PROBLEMS OF PHYSICAL EDUCATION

By GEORGE WELLS FITZ, M. D.

INSTRUCTOR IN PHYSIOLOGY AND HYGIENE
HARVARD UNIVERSITY

May, 1893

PRINTED IN HARVARD GRADUATES' MAGAZINE, SEPTEMBER, 1893



PROBLEMS OF PHYSICAL EDUCATION.

HARVARD'S establishment of a laboratory for the experimental study of the physiology of exercise is a clear acknowledgment of the high educational claims of physical training. It is a distinct advance in the history of physical education, for though hitherto there has been much actual instruction in gymnasium and athletic work, and in measuring and prescribing exercise for students, little has been done in the study of the physiological and psychological effects of exercise. On the other hand, physiologists and psychologists have been little interested in physical education for itself, and their investigations have thrown but occasional, one might say accidental, flashes of light into its many dark corners.

It is but a few years since educated men, and even less time since physicians, have devoted themselves to the work of body training, and in this time the energy has been mainly directed to making tables of measurements and in devising new apparatus and series of movements. While this has resulted in clearly defining certain physical types, and has rendered possible such valuable tangible syntheses as Dr. Sargent's statues of the medium male and female student of twenty-one years, it has given us little besides size, form, and strength, and changes in terms of size, form, and strength, resulting from growth and training. Those engaged in the work have been too busy with the practical side, or too little versed in exact physiological methods, to give much time and thought to the less tangible aspect of exercise. The result is apparent, for physical education is now a rival to medicine in the number of systems claiming the confidence of the public. In the absence of exact physiological knowledge, various more or less reasonable and far-reaching hypotheses have been assumed, and elaborate theories and systems of training based thereon. This condition is still further complicated by the fact that physicians are divided in their support of these warring systems, and make the confusion still greater by becoming warm partisans. The recent advent of a new (to us) system backed by wealth and social influence, and thus commanding wide attention, has precipitated a discussion of disputed points concerning the physiological effects of exercise, and made clear physiologists' igno-

rance of some essential facts. Indeed, physiology seems to have had little to do with the development of any system of physical education. Physiologists disclaim ability to settle the points in dispute, pointing out the fact that experiments have not been made which would give the right to make definite statements.

This brings us to an important guiding thought in any consideration of physical education. Is it true that the body in structure and functions is the result of the activity demanded by the environment through ages of development, — the activity of the every-day life of the savage who did everything for himself, and was unrestrainedly active? The old Greek statues and the savage nations of to-day show that there is no essential change in type, that we share with them a structure developed by forces which acted much more remotely in the history of the species. The savage with his all-round activity may be, and proverbially is, symmetrical, strong, graceful, and able to ride, swim, paddle, climb, use bow and arrow, throw lance or boomerang, with a skill which shows a high coördinative power. If the human body has been evolved by this kind of activity, and its ideal condition may be reached in this way, what part have we in any artificial system of exercise? Does not the infant start with the heritage of potential savage perfection, with all the bones, muscles, and nerves, responsive to activity, ready to reproduce in his development the evolutionary history of the race? What, then, is the real need in the life of to-day, except the opportunity for the activity which will develop these latent possibilities? Should we then be savages? Is it best that we have this perfection of physical powers, — does it not mean a use of time and energy which would be far more valuable if devoted to mental development? This is a question that has been forcing itself upon educators for many years, and may we not consider the increased time and opportunity afforded physical development in the schools of to-day a partial answer?

What is the result of our highly differentiated, conventional life with its pure mental ideal? The army records show a lowered physical standard, the neurologist and alienist report a marked increase of nervous and mental diseases, the general practitioner finds a large percentage of his patients needing only less mental and more muscular exercise, the teacher is forced to balance the

strain of continuous mental application by stimulating physical activity, and the true educator recognizes that the brain is not completely trained until the higher motor centres are able definitely and accurately to control the muscles in their infinitely complicated combinations, and so he sees only half-trained students graduated from the various educational institutions.

Fortunate it is that physical characteristics evolved so laboriously cannot be quickly lost, hence it is possible for any generation to rehabilitate itself by entering fully into its physical inheritance, even so far as to overcome the effects of actual hereditary disease, or of physical depression tending to the acquirement of disease. If the Greeks had left us statues of an average youth and maiden in addition to the beautiful ideal figures, our debt to them would be much increased, for we could then estimate with confidence, by comparison with Dr. Sargent's figures, the changes which have resulted from our changed life, and the lesson drawn would be invaluable. It is very natural there should be acquired changes, for our ideals of form are largely artificial; grotesque vagaries of dress being substituted for the simple, graceful attire of the Greeks which harmonized perfectly with their nobler physical ideals, and, being always subordinate to the form itself, kept that pure and high. The influence of ideals upon the development of individuals cannot be strongly enough emphasized. How far the round shoulder, drooping head, and flat chest, which characterize the average student, are due to the lack of a high physical ideal, rather than to weakness of muscles and ligaments, is still to be determined, but is of far-reaching importance. Granting that every normal infant inherits the possibility of complete mental and physical development, we come to the problem, How may we supplement the restricted activity of its enforced conventional life? But we are instantly met with the pertinent query, "In what way is he lacking,—what is his real need? Must we supply the activities which evolved the racial characteristics, or may we select more economical methods?" This has been answered by the framers of the various systems of physical training, in as many ways as there are systems. The lack of unity among the systems is dependent upon the vagueness with which the question can be answered. What is the real need? In what is the ordinary boy or girl weak? In health? strength? vitality? or power to see

external physical conditions, and to make the appropriate motor responses? We cannot afford to assume that it is one or the other, for this is the fundamental problem of physical education.

In this age of economy we must broaden the physical life as far as possible without encroaching upon the time for mental training. The Delsartean emphasizes the need for grace, asserting that all else will come to the then harmonized organism; a "Psycho-Physicalist" insists that all force comes from the sun and is gained through respiration,—hence breathing is the all-important end of training; the Swede demands that we ignore nature's training, and even her methods, and, beginning with the most elementary movements, develop our powers according to Ling's scientific scheme of progression. Fortunately in America, and especially here at Harvard, what might be called a rational method has prevailed in which the individual has been the centre of attention and study, and his needs have been determined, as far as possible, as a basis for his guidance in the broadened physical life opened up to him by gymnastics and athletics.

Now that teachers are becoming conscious of the need for physical training as a part of the regular school work, all the problems assume an increased importance. Again we must ask, What is the real need? Few teachers will affirm with any confidence that there is one general need, for they must realize, as few others can, how extremely varied are the physical heredity and experiences of the pupils. What are the tests we can apply? The tape-measure and dynamometer will not enable us to distinguish between a hod-carrier and an athlete,—the finer brain differences cannot thus easily be determined. What is it the awkward boy lacks, and how may he be trained into grace? Why does one boy get out of breath easily, and respond more slowly to exercise by increased strength and health? Why can one throw a ball, a spear, or a tomahawk straighter than the other? Why can one boy juggle with balls or jackknives, and do all sorts of tricks, to the despair and envy of his fellows? Why is it that one can jump away from a sudden danger while another is caught? Why is one boy a better catcher behind the bat, or able to hit the ball surer in tennis or baseball? What is the essential difference between the good and poor fencer or sparrer, etc.?

Again, what will give the best muscular development,—heavy

or light exercise, quick or slow? Can we better develop heart and lungs consciously or unconsciously? Do we get better neuromuscular training from systematic movements made at command, as in the Ling system, or from movements prompted by the perception and interpretation of accidental external conditions, and so made (coördinated, etc.), as accurately to satisfy those conditions, as in a game of tennis or handball? Of course, clear tests of the results of the different kinds of training are necessary to answer such questions, but such tests have not been devised, nor the necessary apparatus invented. The whole question of the relative value of games *versus* arbitrary systems of gymnastics is an open one which can be definitely settled only by careful study of the results.

These problems are exceedingly complicated and difficult of solution. Doubtless many years will have passed ere they are all solved, or even clearly stated, yet many of the problems may be solved, and much of value determined easily and quickly. To that end, and for instruction in physiology and hygiene, the Physiological Laboratory was established in the Lawrence Scientific School a year ago. A comfortable, well-lighted room and \$1,000 were given as a foundation. A workshop was immediately organized in one end of the Laboratory with a screw lathe, chucks, turning tools, files, hammers, etc.,—in fact, all tools necessary for metal and wood work,—such an outfit as a model-maker requires. Here was placed a skilled machinist of large experience in making experimental apparatus, and here he has been steadily working to equip the Laboratory with the apparatus necessary to carry on its peculiar work. The apparatus is essentially a product of the Laboratory, for it is not only made here, but it is also specially devised for its work,—hence, is more or less unique. The problems are so numerous that our main hindrance has been the delay necessary to make the required apparatus. Already we have apparatus enough devised to keep the machinist busy a year, with a prospect of many more before the year is past. Each advanced student is required to pursue some line of original research to a successful issue, and report the result in a thesis. The supply of material for study at Harvard is unlimited, being furnished by the hundreds of men using the Gymnasium and belonging to the athletic teams. The Cambridge

schools render possible the study of various physiological phenomena through a wide range of years, and the determination of the rate of development of the physical powers in relation to age, etc. Such questions as the effect of alcohol and tobacco upon strength and development come legitimately within our scope, as well as many similar problems affecting student health and growth. Such is our Laboratory, and such its mission.